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THE CENTENNIAL OF EZRA CORNELL AND THE DEDICATION OF THE BUILDINGS OF THE NEW YORK STATE COLLEGE OF AGRICULTURE

GREAT preparations had been made for the exercises attending the Centennial of Ezra Cornell on the 26th of April. The greatest musical festival ever held at Cornell, which lasted for three days, from Thursday to Saturday, was an unqualified and unequaled success and supplemented the other exercises which were planned to take place in a gigantic tent.

On Thursday a steady rain began which lasted till Saturday. It soaked the tent. Lakes formed on the ground where four thousand people had been expected to sit. The tent exercises were abandoned and the Armony substituted. The student parade was also omitted because of the bad weather conditions. Mr. Andrew Carnegie who was to make the Centennial address was taken ill which compelled him to send regrets and a written speech. Other expected guests of prominence were unable to be present.

Amid a steady downpour the University gathered in the Armory to take part in the Centennial exercises of Friday morning. The Armory being far too small to seat the audience, the floor was largely left free from chairs so that a larger number could attend by standing. Mr. Carnegie's speech was read. In it the life of Ezra Cornell was reviewed at some length and the lesson drawn from it of simplicity, truth, and self-sacrifice. Dr. Andrew D. White followed with a masterly tribute to the founder. Messages were received from Senator Foraker and President Jordan of Stanford University and speeches made by W. H. Corbin, '73, Sherman Moreland, '92, and W. W. Taylor, '07. The exercises were remarkable throughout for their dignity and impressiveness and for the enthusiasm of the participants who after many disappointments and under the most unfavorable circumstances carried the Centennial to a successful culmination. It was a real evidence of the Cornell Idea.

THE DEDICATION

After years of hope the agricultural interests of the Empire State found expression in a College of Agriculture. After twenty years of existence and at the end of a long struggle this

college secured a building in which to work.

On May 9th, 1904, the bill was signed providing $250,000 for the buildings and equipment of a New York State College of Agriculture at Cornell University. At that event the students turned out for a celebration in which they held a parade, bonfire, fireworks and banquet. On May 1st, 1905, the ground was broken for the new buildings. A plow held by Dean Bailey and drawn by a hundred students started the work. It was almost two years later, on April 27th, 1907, that the buildings were dedicated and formally opened.

For the dedication exercises of Saturday a more beautiful day could not have been imagined. The sun s niled on the event so promising for agriculture. After the long rains Ithaca appeared at its very best.

The Armory was trimmed with Cornell colors and the national flags, a large section in the center being reserved for the College of Agriculture and its guests. Representatives of many of the various agricultural institutions in the state had been invited and were seated on the platform. The building was filled with students, alumni and faculty of the college.

President Schurman entered with Governor Hughes who was accompanied by his Military Secretary, Colonel Treadwell. The audience rose and greeted the governor with prolonged cheers.

After a prayer by Rev. Charles Mellen Tyler, President Schurman introduced Governor Hughes who in an address characteristic for its clearness and directness reviewed the purposes for which the college of agriculture was founded and the importance of its position for the welfare of the State. At the end of the address, the Governor, for the State of New York, handed to President Schurman the keys of the new buildings typifying their surrender to Cornell University.

General Stewart L. Woodford was introduced and spoke briefly of the early days of Cornell, giving several reminiscences. He dwelt particularly upon the importance of military drill as a support to the technical schools and called for the maintenance of that drill as a bulwark of the nation.

Ex-Governor Nahum J. Bachelder of New Hampshire, Master of the National Grange, comprehensively reviewed the importance of agriculture to the nation and noted that all aids of agriculture were aids of the nation and therefore patriotic efforts. Governor Bachelder called special attention to the magnitude of the agricultural interests and their power in the nation if concertedly applied.

The last address delivered by Director Bailey was followed by applause from the audience of such duration that it had to be stopped in order to close the exercises of the morning. Director Bailey reviewed the purposes and activities of the College of Agriculture and showed their significance to the great developments in the state and nation. He pointed out the passing of the old methods in country life, education and religion and emphasized the need of new policies to take their place. He showed the futility of an attempt to make one college of agriculture teach all or part of the young men and women from all the farms of the state and said that the greatest and only factor in the education of most country children was the rural district school. It is in the development of this that one of the most difficult and at the same time important problems is concerned. Professor Bailey said that wherever there was a man working upon the land, devoting his life to labor in the open air, holding himself dependent upon no one—that the College of Agriculture stood for that man.

After the morning exercises a luncheon was served to the guests of the University in the gymnasium, following which an inspection of the new buildings took place from two to four o'clock. Many of the departments of the college had on view exhibits of work and methods with members of the staff to make explanations.

Students and faculty united in acting as guides for the visitors If anyone had been in doubt during construction as to either the beauty or efficiency of the buildings it must have been dispelled when the entire group was thrown open for inspection. The great windows and wide halls gave a greater openness in appearance than is had in any other building at Cornell. At four o'clock a reception was given in the Assembly hall, tea being served by ladies of the faculty of the College of Agriculture. A little later the Governor arrived and thoroughly inspected the new buildings with Professor Bailey. Many of the alumni as well as the other visitors pronounced themselves astounded at the recent rapid development of the College and the fine equipment which it was beginning to gather.

The dedication ceremonies were indeed an important milestone in the progress of the College. April 27th marked the culmination of many plans and the formation of many more. The College of Agriculture is not finished, it is merely begun. But to those who attended the exercises there was no doubt but that the beginning was a good one.

THE EVOLUTION OF THE EXPERIMENT STATION

By E. W. Allen

Editor of the Experiment Station Record, U. S. Department of Agriculture

THE experiment station is a strictly modern institution. It has become so firmly established as a part of our agricultural system and has accomplished so much that we fail to realize, unless we stop to think, how short a time there has been anything like systematic investigation in behalf of agriculture. A large proportion of what we now know about the growth of plants and animals, the principles underlying dairying, and the significance of natural conditions, has been learned almost within the lifetime of the present generation. For example, less than seventy-five years ago the source from which plants derive their carbon, which goes to make up such a large bulk of all vegetation, was not known. According to the humus theory it was supposed to come from the humus of the soil, the plant taking up the carbon in the form of decomposed organic substances through its roots. Liebig not only disproved this theory, but established the interdependence of plants and animals in relation to this substance, showing that the poisonous carbonic acid which animals give off in breathing is taken up by plants through their leaves and elaborated into various organic substances, and that they in turn give off free oxygen which is suited again for animal respiration. The fact that such a fundamental principle as this, which is now a commonplace of science, was not understood, fairly illustrates the status of knowledge as to plant and animal nutrition at that time.

The need of agricultural experimentation had been pointed out earlier, and methods were being developed. Albrecht Thaer, a German physician and agriculturist, writing in the early part of the last century, made an appeal for investigations into the principles of agriculture by means of the sciences, pointed out the prime importance of such investigation to progress, and made such knowledge the essential basis of agricultural instruction. He urged that "It is the duty of the government to place some well-educated men in a position to employ their time and talents in investigating the secrets of Nature for the advancement of agriculture and the general good," thus foreshadowing the experiment station as a public institution.

It was nearly a quarter of a century,

BY COURTESY U. S. DEPT. AGR.

APPARATUS FOR LIFTING AND WEIGHING TANKS, USED IN STUDIES OF WATER REQUIREMENTS OF CROPS AT CALIFORNIA SUB-STATION

however, before systematic investigation began, and fully forty years before the first experiment station was organized as a public institution. In 1851, a farmers' club established a station at Moeckern near Leipsic, and furnished the equipment and means for carrying on its work until government aid could be secured. Boussingault had for some time carried on experiments at Bechelbronn in Alsace; Liebig had conducted a laboratory

and experimental fields at Giessen; John B. Lawes, at Rothamsted, England, had made experiments, beginning with 1837, on the use of phosphates treated with sulphuric acid, which led in 1842 to his taking out a patent for making superphosphate; and in 1843 Dr. J. H. Gilbert, a pupil of Liebig, became associated with Mr. Lawes in his work, and the more systematic experiments at Rothamsted were commenced. But these were all private undertakings. And hence the Moeckern Station, with Dr. Emil von Wolff as director, is commonly looked upon as the pioneer of its class.

The growth of experiment stations in Germany was quite rapid. In 1856 there were five, in 1861 fifteen, and in 1866 thirty. Other countries followed the example, but it was not until 1875 that the first American station was established at Middletown, Conn., which was subsequently moved to New Haven. In 1880 there were four stations in operation—California, Connecticut, New Jersey, and North Carolina, and in 1887 there were seventeen stations in fourteen States. In that year the movement became a National one, Congress passing the Hatch Act providing for the establishment and maintenance of stations in all the States and Territories. There are now fifty-nine stations in the United States and its possessions, with numerous branch stations, and the system is steadily growing under National and State aid.

There are now something over eight hundred agencies in the world which may be classed as experiment stations. The largest number of these is in Russia, which has one hundred and fifteen such institutions, although a considerable number of them are little more than demonstration fields. Germany has ninety-eight stations, France ninety-four, Austria forty-two, Australia thirty-six, Great Britain forty-one, Sweden thirty-seven, Japan fifty-eight, Italy forty-nine, Hungary twenty-nine, Belgium seventeen, Norway thirteen, Switzerland fourteen, Denmark ten, and the Netherlands seven. Mexico has recently estab-

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ALASKA STATION BUILDINGS

lished several stations, but there are none in Central America, and no stations proper in the South American countries, although several of these have similar agencies for experiment and investigation. In proportion to the area covered, the United states has fewer stations than any other country except Russia, the area of farm land per station in this country being about fifteen and a half million acres.

In many respects the American stations are very different from those first established in Germany, or which are in Europe today. They constitute a distinct type and present many unique features. They are an adaptation of the European stations to the conditions and requirements of this country. In their development the Rothamsted Station had a great influence, as the plat system was highly developed there, the experiments with animals had taken definite practical form, and the work of that station was more familiar to people in this country. But upon it and the European stations generally have been grafted various departments like horticulture, entomology, veterinary science, irrigation engineering, dairying, etc., not found in the prototype. Some of these subjects were provided for by special stations, but at no one station were they combined.

In no other country are the stations organized into a national association similar to that of our Association of American Agricultural Colleges and Experiment Stations. Several countries have associations for deciding on methods of analysis, seed testing, etc., but these do not deal with the broad problems as station management and work.

The European stations have as a rule been highly specialized, being devoted to some special branch of agriculture or some particular line of investigation. This has given them an individuality and identified their

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PORTO RICO STATION—COFFEE-SEED BEDS UNDER ARTIFICIAL SHADE

names and their directors with special lines of inquiry, rather than with general efficiency in a wider field of agriculture. Thus the Weende Station, later removed to Göttingen, became famous for studies upon the principles of animal nutrition by Henneberg and his assistant Stohmann, Moeckern for similar work by Gustav Kühn, Darmstadt for Wagner's pot culture work on the use of fertilizers, and the Bernburg Station for Hellriegel's studies on the fertilizer requirements of plants, which led to his discovery of nitrogen assimilation by legumes and the agency through which this takes place.

BY COURTESY U. S. DEPT. AGR.

ALASKA STATION—GRAIN GROWN AT RAMPART, ABOUT SIXTY MILES FROM ARCTIC CIRCLE

If a farmer had applied to any of these stations for advice in combating a plant disease or an insect, or as to the cultivation of a special crop, or presented a problem in fruit growing, or the care of milk, or the manufacture of dairy products, he would probably have received no assistance, for they had no specialists in these lines and gave no attention to them. Their work was very largely confined to the laboratory, greenhouse, and small plats. They had only small tracts of land, and frequently none at all. They did not conduct experiments on the commercial aspects of farming, or apply their results on a commercial scale. This they left to the farmers and their societies. They were not in close touch with the farmers as a whole, and did not feel the responsibility to them which the American stations feel to their constituency. They were not expected to furnish general advice to whomever might apply, or to conduct demonstrations, or write popular articles, or deliver popular addresses, except in a very limited way. They issued no regular bulletins or reports of their work, but described it in the local agricultural press or in scientific journals. This was likewise true of the control stations, many of which had little but the fertilizer control and

miscellaneous analytical work which they conducted for their constituents, usually at stated fees. The administration of the European stations was, therefore, a simple matter and quite different from that of the modern American station.

While there have been some changes in recent years, and the "American idea" has taken hold to some extent, the European stations as a whole still retain their distinctive character. Their specalization and freedom from as to create the impression, at times, that the sole duty of the station was to the present-day farmers of their localities, instead of to agriculture in a broad sense. While this has served to popularize our station work, to make it unusually effective in the improvement of agriculture, and to secure financial support for it far in advance of that given in any other country, there has been a danger that this point of view might permanently affect the standards for station work

BY COURTESY U. S. DEPT. AGR.

HAWAII STATION—PINEAPPLE PLANTATION

outside demands is conducive to fundamental investigation, and we in this country have profited very greatly from the results of it. But the system does not afford the opportunity for studying broad agricultural problems in all their bearings, and it does not make the station work so immediately effective.

In this country we have gone to the other extreme, and have kept the practical relations of the stations so prominently and constantly in view and the ideals of men entering upon it.

It was a realization of this that led to the drafting and passage of the Adams Bill, which will double the appropriation to the stations from the Federal Government, but restricts the use of this fund to "original investigations and experiments." The Adams Act reaffirms the main purpose of the experiment stations, which, as stated in the Hatch Act, is "to promote scientific investigation and ex-

periment respecting the principles and applications of agricultural science." It has already given a great impetus to work of the character which aims to extend the boundaries of definite knowledge by systematic studies, as distinguished from inconclusive experiments, disconnected trials, and demonstrations of facts already known.

The responsibilities now resting on the experiment stations are very heavy. The country at large has become thoroughly aroused to the desirability of agricultural teaching from the lower to the higher grades, to the need of a more intelligent basis for this great industry, and to providing efficient means for carrying these things to the public. In meeting this demand, the experiment station is the main creative agency; the college, the agricultural school, the farmers' institute, the extension department, and the agricultural press are distributing agencies which look ultimately to the stations for their stock in trade. The efficiency, development, and success of these agencies will necessarily depend in very large degree on how well the stations prepare the way.

The greatest need of the experiment station work in this country today is *men*,—men thoroughly trained and consecrated to this great work. There has always been a dearth of men suited to the higher positions, but the coming of the Adams fund, with the increased call which it has made for men of this class, has brought forcibly home to many a station the difficulty of repleting its staff. Our needs are changing. Time was when men went practically from the college course to responsible station positions. Not so now. The present need is for men who will prepare themselves in a thorough and systematic way by advanced study, as for a professional career in other lines. This, then, is the opportunity to the agricultural student to-day who has a taste for that kind of work.

In this connection it is well to remember that more station men are deficient from the standpoint of scientific training than of agricultural practice. The latter is largely local, and a matter of information acquired without special difficulty. The former embodies a systematic knowledge of fundamental facts and methods of work, the spirit of which is expressed in an attitude of mind and a point of view. We are gradually coming to realize that agricultural investigation requires as high order of training and ability as research in any department of science, and that it opens up careers offering quite as great possibilities for usefulness. Our work in several lines is practically at a standstill for lack of men equipped to do it. The call for men is loud and long. To meet the need and maintain the supply we must look to the agricultural colleges and universities, and happily these are equipping themselves to adequately prepare men for such careers. Thus the interests of these two classes of institutions are interwoven, and they are seen to be mutually dependent.

EDUCATION FOR THE FARMER

By F. A. Salisbury

President of the N. Y. State Experimenters' League

Having pursued a short course in agriculture at Cornell and now living on the farm, the writer realizes a little of the value of the training one can get from the course.

The line of farming in New York State has undergone a great change during the last generation. In our locality up to about 1880 the principal income on the farm was derived from grain growing and most of the farmers were prosperous, were paying for their farms, improving the farm buildings and in many cases made a good surplus. Things have gradually changed until to-day grain is grown as a secondary

crop in the rotation, and fruit and vegetables have taken the first place. To grow these crops with profit requires more skill than was formerly used in growing the grains. The time has come when the farmer has to inform himself in some way how to cultivate and care for his crops if he keeps abreast of the new conditions which are constantly arising.

In every case which has come under my observaton, and I believe this will apply to most localities, the properous farmers are the ones who take some means of informing themselves as to the most approved methods of conducting their farms. They do this by reading the agricultural papers and bulletins, attending institutes or adopting the methods of their progressive neighbors. This is as it should be, for an exceedingly small number of us have original ideas, succeeding only by adopting the ideas of others. This being the case, the farmer should consider the best means of getting his knowledge. A doctor or an engineer, might by years of study succeed in getting the necessary knowledge for their profession, but any one taking up these professions knows that the shortest and wisest way is to take a practical course of training. The principles that underly agriculture are so deep and so many that some time can as well be spent by the farmer in studying them where the principles are understood as by the man who aspires to be a physician.

Although brought up on a farm and interested in the farm, I believe that the course at Cornell Agricultural College taught me more than I could have otherwise gained in years.

The question, "What is the value of an agricultural course?" should be asked by the farmer. Statistics show that in other occupations the trained man succeeds best. That a course in agriculture fits a farmer to succeed financially there is abundant evidence. The writer knows of a number of cases where new methods learned in the college have given fine financial returns. In this age when diseases and insects play such an important part in our failure or success we need the latest imformation as to the best methods of combating them. Those who have had the teaching that an agricultural college affords have had given them the best known means of combating these diseases. For instance, the knowledge I gained in regard to spraying potatoes alone, put to practical use, has been worth hundreds of dollars.

I believe one reason why more farmers have not taken the course is because they do not know of its practical value. The writer was ignorant of the nature of the instruction he was to get in the course, but has found that there is scarcely a farm problem in which the course does not help him. The lessons I learned have been of practical value in the farm work.

I am not attempting to point out that any certain course is best, but to point out that the farmer who has had some training for the farm is best equipped to succeed in his calling and to get the most pleasure out of it. When some instruction is given in agriculture in our rural schools there is no doubt in my mind but that much more interest will be taken in agricultural courses. The limited knowledge gained in the rural school will then be the incentive for a more thorough knowledge of agriculture.

The financial side of farming is not the only one to be considered. The course opens one's eyes to the possibilities of the farm in the way of improving its appearance and value, such as the setting out of trees and making waste places on the farm more productive. Then there is the social side. The college puts us in touch with others who are interested in growing the same crops that we grow. We get acquainted with them, compare notes, get new ideas and inspiration from them. The associations and acquaintances thus formed give usa broader interest and outlook in life.

The agricultural course has made the farm more profitable, more attractive and more interesting for me.

THE NEW POULTRY HUSBANDRY

By James E. Rice
Assistant Professor of Poultry Husbandry

THE new Poultry Husbandry differs from the old both in principle and method. New principles have been discovered and old methods have been improved. The evolution of necessity has been gradual. Changes have been wrought through the slow process of experience rather than by startling discoveries of new truth. It has been a steady, forward movement by many practical poultrymen rather than a sudden revolution in method by a few investiga ors through scientific discoveries. The scientist, however, has contributed an important part, but his contribution has been general rather than specific. Poultry Husbandry has shared with all other trades and professions, in the general educational uplift.

CORNELL UNIVERSITY HEATED COLONY WHERE CHICKENS ARE REARED IN FLOCKS OF TWO HUNDRED. Described in Bulletin No. 246

The changes which have contributed most largely toward the development of modern poultry husbandry have had to do primarily with increasing the number of fowls which one person can handle successfully. It has been a question of decreasin the cost of production by increasin the effectiveness of labor. A 1000 fowl poultry plant can be more successfully handled to-day from a labor saving standpoint by modern methods than could a 200 hen plant with the methods of 15 years ago. This result has been accomplished by improvements in four main directions. They are of about equal importance. They are the four corner stones of successful poultry husbandry. Namely; 1st, a better house; 2nd, more highly developed breeds; 3rd, more effective methods of feeding; 4th, better facilities and greater skill in hatching and rearing chickens in large numbers. A larger, more healthful, more convenient and less expensive poultry house has been evolved.

1. Fowls are given less house room than formerly. The unit for estimating the capacity of a poultry house is based on the allowance of from 4 to 5 sq. ft. floor space per fowl. Formerly 8 to 10 sq. ft. was thought necessary. Therefore under modern methods a poultry house has twice the rated capacity which it would have had 15

years ago. An increase in carrying power of 100 percent.

Hens are now kept in larger flocks. It was formerly thought necessary that fowls be kept in flocks of 10 to 20. Today they are being kept successfully and with greater profit in flocks of 50 to 100, an increase in economy of handling of 20 to 40 percent.

The modern poultry house is large in area, and low. The larger the floor space within a house, the less it costs per hen capacity, other things being equal and in proper proportion. Small poultry houses for mature fowls must go. Formerly poultry houses were built high. Today they are built as low as possible and still permit the work to be done inside comfortably. By this change the cubic feet of air space per fowl has been reduced from nearly 10 cubic feet of air space per pound of live weight, which was once though necessary, to 6 or less cubic feet, a reduction of nearly 40 per cent in the size of the house. Even with this reduction in size, hens are furnished with approximately five times as many cubic feet of air space per pound of live weigh, as are most other domesticated animals.

The fresh air poultry house has proven its worth and is a fixture. It is tight on all sides except the front, which may be loose and should consist almost entirely of cloth and glass. This house provides for a constant, quiet interchange of fresh air without draft and provides a moderate temperature through the temporary retention of the heat radiated from the fowls' bodies and accumulated from the sun by the high open front.

THE NEW POULTRY HOUSE AT THE CORNELL UNIVERSITY POULTRY PLANT
Described in Reading Course, Bulletin No. 33

Notwithstanding the high price of lumber and labor, a neat, attractive, sanitary, fresh air, sun-swept poultry house for large flocks, need not cost to exceed $1.50 or at most $2.00 per hen. See Bulletin No. 33, supplement to Cornell Reading Course. Also Maine bulletin No. 130. By these modern innovations, a 1000 hen poultry plant can be built and equipped to-day for far less money than it was thought necessary to spend 15 years ago on a 500 hen ranch.

2. The modern breeds of fowls are more productive and better adapted to

the special purpose for which they are kept.

The prolificacy of fowls has increased slowly but surely during all the years since their domestication. This has been accomplished, notwithstanding the fact that with poultry more than with any other class of domestic animals, it is difficult to know the individual performance and therefore more difficult to breed for high productivity. Poultry breeding, until lately, has been of necessity, largely for form, size and color, rather than for productivity. Recently, however, the trap nest has come into active, practical use. (Annual Report, R. I. 1899: Maine bulletin No. 100, Cornell bul. No. 247.) As it becomes perfected and poultrymen become educated to its importance, it will be more largely used.

The trap nest is bound to revolutionize the laying capacity of the fowl. The effect is already apparent. The 200 egg hen is here but not in large numbers. Increasing the prolificacy is a slow process. It must be accompanied by rigid selection for strong constitution to withstand the strain of heavy production. (Me. buls. 100 and 130. Utah bul. 200.) This is being done. Twenty-five years ago, 100 eggs per hen was, perhaps, a fair average yield; 125 eggs per hen per year is now a reasonable expectation; 150 eggs per hen per year is not uncommon. Each year by more careful selection and better management, the general average will increase.

The improvement in the meat qualities of certain breeds is quite as marked as egg producing qualities in others. The quick growing, meaty, tender, juicy fleshed, well fattened fowl is not yet fully appreciated, but it is here and in demand and is being improved rapidly.

All poultrymen are sharing in this general improvement of the breeds. An efficient fowl for manufacturing the raw material into the finished product, is a necessity in economical, profitable poultry raising. The mixed breed fallacy is rapidly disappearing. Mongrel flocks are fast becoming the exception. Pure breeds are found everywhere. This is one of the hopeful features of modern poultry husbandry.

3. Better balanced rations are now being used and are being fed in a more practical way.

Although little is known positively about the digestible coefficients of the foods when fed to poultry and although much is taken for granted through knowledge gained by observation of other classes of domestic animals where the digestibility of foods has been worked out, we have, nevertheless, made considerable progress in poultry feeding: more along the line of method of feeding than of the actual composition of the rations. While we do not as yet know for a certainty, the correct nutritive ratio to feed for growth, for eggs, or for fattening, we do know some satisfactory combinations of foods which produce excellent results for each of the purposes named.

By far the most important change, however, which has been advanced in recent years in methods of feeding poultry, is that of hopper feeding of the dry mash. (Maine bulletin No. 130 and Cornell bulletin No. 247.) It is even yet too early to express a positive opinion as to the ultimate result of the practice. But this much seems certain from considerable observation and from the experiments which have been under way at Cornell for nearly two years. Namely, first, that hopper feeding of the dry mash is a decided saving in labor, over feeding wet mash. Second, that with young fowls of the egg breeds, as large or larger production of growth or eggs can be obtained with a dry mash. Third, that having constant access to a ground feed, serves as a balance wheel to prevent under feeding, which is likely to occur by any system of hand feeding. The fact that the fine, dry meal is difficult for fowls to swallow and that fowls prefer whole grain, which should always be fed at least once or possibly twice a day in a deep litter to induce exercise, seems to be sufficient safeguard

against over feeding. This may not be true of certain breeds or of old fowls or for those used for breeding. The ultimate proof of the permanent value of the system, however, can only be determined through the test of time. The verdict will rest finally upon the effect of hopper feeding on the health of the fowl and the vigor of the offspring. The fact that on several conspicuously large, and thus far, successful poultry farms they have been practicing this system for several years, would warrant us in cherishing the belief and the hope that hopper feeding will become a permanently established practice in the rational feeding of poultry.

4. A better system for hatching and rearing chickens in large numbers, is known.

The weakest link in the chain of successful poultry farming, is the necessity of renewing the flock every one, two, or at most, three years. On most poultry farms it is customary to renew one-half the flock each year, which requires that as many chickens be raised to maturity, as there are fowls in the flock, when the plant is run at full capacity.

The inability of the poultryman to raise each year with certainty, the required number of chickens, has been the cause of more poultry failures than all the other causes put together. The ability to hatch and rear chickens successfully in large numbers, is the "key" to the whole situation. The new poultry husbandry has found the key. But this key belongs to a "combination lock" with at least four combinations.

First: Fertile and strong eggs are secured by killing weakness at every appearance from shell to maturity and by breeding only from mature fowls which have known vigor and reproductive power. The breeders, therefore, should be selected during their first productive year and housed under open, free range conditions and not force fed.

Second: Perfect incubation has not been attained, but we can hatch chickens in large numbers more successfully than ever before.

Third: The saving in labor by hopper feeding young chickens, is is immense when compared to the old time hand methods where it was thought necessary to feed five times daily on various mixtures. This modern method makes possible the raising of chickens by thousands instead of by hundreds.

Fourth: Chickens can be reared in flocks of 150 to 200 as well as in flocks of 25 to 50, formerly thought necessary provided proper brooding conditions are supplied. This has been done successfully for several years in colony houses 8 feet square heated by gasoline. The large house and hover and high heat of the gasoline are essential factors of the system. By the high temperature, pure, warm air can be supplied at all times even during cold weather. (Cornell bulletin 246). By this means at least 75% of the labor of brooding chickens is saved.

The raising of chickens is no longer wrapped in mystery or fettered by limitations of small flocks. Man has mastered the situation. Chickens can be raised economically and successfully in large numbers.

Thus new ideas have taken poultry husbandry out of the realm of a "hazardous risk" and have placed it among the safe, conservative occupations, capable of wide expansion and offering an attractive field for profitable investment. At last poultry husbandry has come to possess the first essential necessary to command the respect and compel the attention of thinking men; namely, stability.

THE WORKER

A WALKING SUMMER SCHOOL OF AGRICULTURE

By H. S. Ogden, '06

(CONCLUDED)

ON August first, I arrived at Wyoming, Delaware. My outfit was deposited with tolerable security in the office of the railway clerk while I started out to reconnoiter. It was raining and had been raining in Wyoming every day, so the natives said, for the past month. Soaked were the village streets, in places hardly passable, while overhead hung a leaden sky of unpromising gray. The shelter afforded by the awning of a country general merchandise store, located on a nearby corner, had attracted a number of idlers, so thither in quest of information I made my way. A little apart from the group was a man sitting dejectedly on the iron seat of a machine and presenting a most melancholy figure as he gazed sadly at the rainy prospect. Through some subtle bond of sympathy, I divined that, like myself, he was in search of work so inquired of him what was the outlook for a job. Evidently I had touched a sensitive spot.

"Outlook!" he exclaimed with bitterness, and added laconically, "Nothin' doin'."

Upon further conversation it developed that he had just left a place several miles in the country because, as he explained in self-justification, his German "boss" made him work fourteen hours a day and provided as an unvarying diet, sauerkraut. "And how," he questioned contemptuously, "can anybody but a Dutchman live on sauerkraut?"

The position was probably still open and could I successfully adapt an American appetite, might do if nothing more attractive turned up. "Fourteen hours a day" did not sound alluring, especially as I had just finished a hard week in Southern New Jersey. With this and a few friendly hints from other sources, I started forth in the drizzling rain. From Wyoming I tramped southeastward to Camden where I was fortunate, or unfortunate, enough to be offered a "lift" several miles further into the country and stopped to make inquiries at the establishment of an extensive apple grower. The reception was courteous but the answer, negative. Still onward I waded to another village, named most inappropriately to present weather conditions, "Rising Sun." At this place the apple grower had said was located a cannery of which the manager owned several farms and could probably provide work. To the cannery I came and rapped gently at a small door marked "office."

From within came the voices of several men in conversation, too engrossed apparently to heed my knocking, so, very softly, I turned the knob opening the small door wide enough to admit my head, thus permitting a prompt departure should my visit prove untimely. Five men were seated around a stove; this much I observed, when one of the members called in an irritated voice, "Well—come in!"

The manager of the cannery of "Rising Sun" was inclined to be short and snappy and voiced a series of refusals before I had time to make as many requests.

"What do you want?" he asked. "Work in the cannery? Don't need any men. Have all the farm hands I want. Where did you come from? Who sent you here?" This rapid fire aroused my temper as well, so, bidding a very curt farewell, I left.

Outside it was chilly, dusk was falling, yet four miles of muddy country roads, degenerated in places to a series of pools, lay between me and Wyoming and I well tired out from a fruitless all day tramp.

At such low ebbs, far from kindred

or even an acquaintance, the world assumes for one a curious aspect of hostility. Food, shelter and security I had regarded hitherto as matters of course, but in working one's way they became matters of keen struggle and effort.

After leaving the office of the cannery, I buttoned up my coat and cast about in the gathering darkness for the right road back to town. While so engaged the cannery office door opened, and in the stream of light I saw a man, not my interviewer, however, come out and proceed to a horse and carriage standing nearby under a tree. Since anything in the form of a vehicle appeared most attractive, I remained silently watching him as he unhaltered his horse, nor were my hopes to be disappointed.

"Son," he drawled, "it's sort of a long walk back to town. If you want to jump in I'll give you a lift." And so in due time we arrived at Wyoming.

My benefactor before parting had told me of a certain "workingmen's boarding house" and there I took lodgings for the night. The all-day tramp had not decreased my appetite for a late supper nor for subsequent meals as well. Perhaps the landlady had her reasons for wishing on my departure to collect above the stipulated rate, a proposition, however, to which I found it impossible to agree.

Of Wyoming and rain I had my fill, so next day boarded a train southbound for Berlin and the Maryland "Eastern Shore."

* * * * *

The journey was long neither in miles nor hours yet my fortunes changed greatly for the better. Berlin had been selected because in this town was situated a large fruit tree nursery, a thousand acres in extent to which I was fortunate enough to carry a letter of introduction from the Department of Horticulture at Cornell. The manager treated me with true southern hospitality, driving me around the vast establishment. Indeed agriculture on such a large scale was a revelation and I was profoundly impressed with the magnitude of the enterprise. Moreover it was welcome news to learn that he needed help though the current wages were low to a comic or tragic degree depending on one's point of view. Nine cents for each hour of actual work, not including "keep" was the rate on the "Eastern Shore," time lost on account of bad weather not being paid for, making rainy periods a dead loss. The manager kindly placed me in charge of a young graduate from the Maryland Agricultural College, telling him to take good care of me—an instruction well carried out. This impression was increased when my new acquaintance courteously offered to share his quarters in a pleasant family boarding house, an invitation which I was glad to accept.

Work on the nursery began at seven o'clock and the following day was my initial experience at peach "budding." Cutting "bud-sticks" was the first operation, so for a half-hour the Maryland graduate and I worked with a group of a dozen men, both races represented, thus engaged. This task was comparatively easy for a beginner, but the actual "budding" which succeeded proved difficult so that I soon found the rôle of "tyer" more adapted to my slender abilities, and later I was considerately told that "folks usually begin with tying anyway." In this work I was much interested when suddenly several wild whoops called my attention to a general stampede of all hands to the shelter of a nearby shed. A heavy thunder storm had already blotted out the southwestern horizon and was swiftly approaching and none too soon I joined the race, since several arriving only a few seconds later were drenched to the skin.

During the twenty minutes the violent rain lasted the dozen negroes made things interesting by presenting an imitation lynching, the hero of the performance being a most unwilling pickaninny. He stood the ordeal manfully until, with the noose on his neck, the other end passed around a beam overhead, he was asked did he have any remarks, whereupon he became suddenly panic-stricken and

wailed so loudly that the rather questionable sport was given up.

The storm passed, but the dampness had stopped all "budding" for the day, and we cut "suckers" from the young peach yearlings between intermittent showers. Indeed, so much time was lost through rain that at six o'clock I stood with only forty cents to my credit. Work on the nursery was pleasant, partly because of the absence of an exacting foreman, a marked contrast to the New Jersey truck farm just left. The men worked at a reasonable rate but not under very high pressure. Our foreman was a quiet, unassuming fellow, who labored with us and was one of us. I found him very willing to answer questions regarding nursery work. Promptly at six o'clock he called time, whereupon all hands piled into a large wagon, sent out for the purpose, and we were driven back to town.

My evenings were very pleasant. After continual contact of over a month passed with rough companions, it afforded a unique gratification to associate again with gentle-mannered people on terms of equality. Nor was I too tired at night, after a refreshing bath, to dress up for supper and enjoy an evening stroll with pleasant company around town.

The atmosphere of the place was distinctly southern. The people, their courteous manners and soft accent had all the pleasant and characteristic flavor of the south.

At the Harrison nurseries I remained two weeks, staying to attend the sessions, held at Berlin, of the Maryland Horticultural Association.

Crossing the Maryland peninsula, I took boat up the Chesapeake Bay toward Washington, my native city. Nor do I believe that the Prodigal rejoiced more on his home-coming.

To take a brief retrospect, the trip was on a whole more successful than anticipated. It seems to me that by travelling one may gain a wider knowledge of agricultural conditions than by working all the time in one locality. The experience gave me what I sadly lacked, the beginning of practical knowledge, not to mention that fuller understanding of the human side of agriculture such as comes from a personal experience.

THE RANGE SHEEP INDUSTRY

By G. A. Bell

Assistant Animal Husbandman, U. S. Dept. of Agriculture

SHEEP at present are practically dwellers of the range. In comparison with the range states the others, Ohio and Michigan excepted, make a rather small showing. There were in the United States on January 1, 1906, according to the Yearbook of the Department of Agriculture, about 50,000,000 sheep, of which there were in Montana, 5,751,746; Wyoming, 4,575,042; New Mexico, 3,999,443; Idaho, 3,722,585; Utah, 2,625,401; Oregon, 2,597,595, and California, 2,398,439, or a total of 25,670,251 in these six states and one territory, or more than one-half of the sheep of the United States.

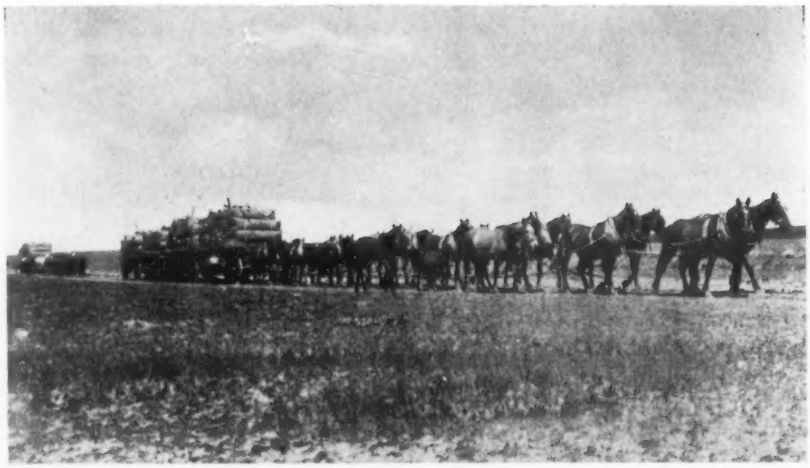
The range herds (the term flocks is seldom used in the West), are largely of a Merino foundation. For the range it is necessary to have sheep which will successfully herd in large numbers, and that have the hardiness to withstand rigorous climatic conditions, as well as occassional periods of starvation. In addition to these qualities a typical range sheep must be able to travel long distances, for in some sections the winter and summer ranges are far apart, the sheep being driven to the mountainous regions for the summer and returned to the plains and valleys for the winter. It is therefore important that the sheep be essentially fitted to rough it. It has been found that the "fine wools" possess these qualities in a greater degree than do the coarser wooled breeds.

At present the Rambouillets and the large smooth bodied Delaines seem to be the most popular of the Merinos. It is now believed, however, by many of the ranchmen, that the Merino should not be bred pure for their purpose, and there has been a great deal of mutton blood added, especially where the ability of the range to produce fine lambs has been recognized. In many instances Cotswolds, Lincolns, Shropshires, and Hampshires have been introduced with good success. This has been especially true in producing mutton lambs. Some of the best lambs which reach our large markets are raised and fed on these Western ranges.

EWES AND LAMBS GRAZING ON THE RANGE

The management of the herd on the ranges varies considerably according to the climatic and topographical conditions of the country. The sheep are usually run in bands of from 1000 to 2000 in number, exclusive of the lambs. Each band is placed in charge of a herder who usually has the assistance of a good dog. During the day the sheep are watched by the herder and at the approach of night they are driven near his tent where they are watched for a short time until they lie down, where they usually remain until morning, unless frightened by wild animals. It is customary to have bells on a number of the sheep which enables the herder, who is in his tent near at hand, to hear them if the sheep should start to move away. Early in the morning, unless a storm is threatening, the herd will start out to graze. The shepherd or "sheep herder," as he is more often termed, hastily finishes his breakfast and sets out after them to see that they do not scatter too wide or go too far. At noon he may return to his tent and prepare his midday meal, while the herd lies quiet for some hours if there is any shade of trees or rocks. As evening approaches he gathers the sheep together and follows them to his sleeping quarters. The work is not usually laborious, but it calls for faithfulness and considerable patience, and to be a really first class shepherd, requires a deep insight into the ways of sheep and of nature as well.

There are times on some of the



HAULING WOOL TO MARKET

ranges during the winter season that the sheep are without feed for two or three days, or even longer. This often occurs after a heavy fall of snow. At such times snow plows are used to make bare strips along which the flocks feed, and in addition to this a little hay is often given them and sometimes corn. In case of some of the more distant flocks, however, it is sometimes several days before this can be done.

Shearing on the range occurs at different seasons according to the climatic conditions. This shearing is largely done by professional shearers, who travel from one part of the country to another as the season advances. On account of the great amount of experience which these men have had, they are able to shear with great rapidity ; in fact, a good shearer will average one hundred sheep a day. Within recent years many plants for machine shearing have been established. The number of sheep which can be sheared by machines is about the same as that done by the professional hand shearers.

There is an intelligent and progressive people engaged in the sheep industry of the West, and they have made great strides in upbuilding the quality of their flocks in the last ten years. That they can and will do things is admirably shown by the way the sheep scab is being exterminated. A few years ago scab was common among the flocks ; to-day it is a rarity.

THE MANUFACTURE OF CONDENSED MILK—VIII.

By O. F. Hunziker

Dairy Husbandman, Purdue University

MARKETS

THE bulk of the condensed milk (especially sweetened condensed milk), goes where the dairy industry is yet in its infancy, or where geographic and climatic conditions absolutely bar the profitable husbandry of the dairy cow. This is the case in the tropics and in the arctic regions. In those countries condensed milk has, in many cases, become as great a necessity as fresh milk is to the inhabitants within the temperate zone.

Most of the sweetened condensed milk sold for direct consumption, both in domestic and on foreign markets, is shipped in hermetically sealed tin cans holding 8, 12, 14, 15, 16 or 20 ounces. The 14, 15 and 16 ounce cans are the most popular sizes. These are put up in cases holding 48 cans each and are sold for from $3.00 to $6.00 per case. It is estimated that the sweetened condensed milk in cans is from 3 to 6 months old before it reaches the consumer. This class of goods is usually sold through the medium of a jobber or broker and not direct to the retailer. First it has to be sold, then comes the transportation, next the delay in the warehouse of the jobber, broker or wholesaler. From there it is transferred to the shelves of the retail groceries and drugstores, where there is again considerable delay before it reaches the hands of the consumer.

The prices at which sweetened condensed milk in cans sells, depends largely on the size of the can, the brand, the competition and the season of the year. In summer when fresh milk is cheap and the supply of condensed milk by far exceeds the demand, there is naturally a drop in the price per case of condensed milk. The winter and early spring condensed milk brings the highest prices. As the price of condensed milk is not controlled by any Board of Trade, there is no uniformity of price throughout the country. The fluctuations in the price of this dairy product do not usually follow the rise and fall of the butter and cheese market. They are more largely governed by local conditions of supply and demand, of composition and of the reputation of the individual brands. While sweetened condensed milk is sold under hundreds of different labels or brands, and while one and the same concern may sell scores of different brands, the brand itself has very little, if anything, to do with the quality or composition of the contents of the can. While a condensed milk company may put on the market a dozen different brands, each sold at its own special price, these brands usually all contain the same quality of milk and may be filled with milk from one and the same batch. It is customary, in most factories, to fill the cans before they are labelled and the orders for different brands of condensed milk are filled from the same stock. The brands are largely an instrument to increase the sales and to "get around" the tactics of competitors.

The sweetened condensed bulk milk which is put up in barrels of 300 to 600 lbs. capacity, is generally sold direct to candy and caramel factories and bakeries. It sells for from 4c to 7c per pound, the price being governed by the per cent of fat it contains and also by the demand and supply.

COMPOSITION

Sweetened condensed milk contains all the constituents of fresh milk and considerable but varying quantities of cane sugar. The relative proportion in which the ingredients are represented depends on the composition of the fresh milk, from which it is made, the degree of condensation and the per cent of cane sugar added to the milk.

The following figures show, in round numbers, the average composition of 50 samples of sweetened condensed milk from 20 different condensed milk companies:

Water			26.5%
Milk Solids	Fat,	9.0%	33.6%
	Proteids,	8.5%	
	Milk Sugar,	13.3%	
	Ash,	1.8%	
Cane Sugar			40.9%
			100.00%

The water content of sweetened condensed milk is largely governed by the degree of condensation and the amount of cane sugar added. The normal variations are within comparatively narrow limits (about 25% and 27%). The milk solids fluctuate between 30% and 37%. The Federal Law requires a minimum of 28% milk solids. The relation of fat, proteids, milk sugar and ash naturally depends on the relative per cent of these constituents in the fresh milk from which the condensed milk is made. The sweetened condensed milk sold in barrels is usually made from partly or wholly skimmed milk, and, therefore, falls below that made from normal milk in its fat content. The Federal Law demands that in sweetened condensed milk sold in hermetically sealed cans, not less than 27.5% of the milk solids shall be fat.

To what extent the milk solids are affected during the process of evaporation in vacuo is not definitely known. The heating previous to the condensing coagulates a part of the milk albumen and alters the casein to the extent that it is not precipitated in the normal way when rennet is added to the diluted condensed milk. But whether the exposure of the milk for several hours to violent boiling under reduced pressure further changes the properties of milk is still an open question. It has also been suggested that the butter fat may undergo some change. This suggestion has been taken advantage of by processors, for the purpose of explaining to the State Milk and Food Inspectors why their condensed milk is low in fat. Men familiar with the properties of the milk fats readily understand that the volatile fats of milk escape during the evaporation of milk under reduced pressure. However, the volatile fats form but a very small part of the total milk fats. Moreover, they are also lost in the chemical analysis for fat (ether extraction), hence their disappearance from milk would not change the results of the fat estimation.

The practical results show, that, where the fresh milk is carefully weighed and tested for fat and the condensed milk made from it again weighed and tested, that the pounds of fat found in the condensed milk correspond with those of the fresh milk, provided, of course, that the condensor has been careful, not to allow any of the milk in the vacuum pan to boil over.

Most sweetened condensed milks contain from 37% to 43% of cane sugar, although wider variations are not infrequent. In some cases the analyses showed as high as 48% and in others as low as 30% cane sugar.

The specific gravity of sweetened condensed milk rests within the limits of 1.24 and 1.35, according to the degree of condensation, the per cent of fat and the per cent of cane sugar. Milk condensed at the ratio of about 2.8 parts of fresh milk into 1 part of condensed milk, and containing about 9% fat and 40% cane sugar, had a specific gravity of from 1.28 to 1.29. The specific gravity of sweetened condensed skimmed milk may be as high as 1.35; if it contains an excess of cane sugar it will be still higher.

FERMENTS

Sweetened condensed milk is not sterile, notwithstanding the fact that the "guarantee" conspicuously printed on some of the labels, include the statement that "the milk in this can is absolutely free from germs." There is nothing in the process that would cause the destruction of all germs in the sweetened condensed milk. Bacteriological examinations of sweetened condensed milk show that the latter contains a variety of species of bacteria, both spore bearing

and non spore bearing, also yeast and moulds. When the fresh milk is heated to 180° F. previous to condensing most of the vegetative forms of bacteria and other micro-organisms are destroyed; the spores, however, are not affected. With the addition of the cane sugar a large number of germs may gain access to the heated milk, depending, of course, largely on the purity of the sugar. The temperature in the vacuum pan is not high enough (130° to 140° F.) to prohibit their existence. At the completion of the process the condensed milk is drawn into non-sterile cans, these cans are set open into the cooling vat, where the condensed milk is stirred with non-sterile paddles and without protection from the factory air. Then it runs through the filling machine into the tin cans which are subsequently sealed with caps that have passed through the unclean fingers of the press hands and sealers. These channels of contamination cannot well be eliminated. In addition there is naturally a great deal of unnecessary contamination caused by carelessness, and ignorance on the part of the employees. It is unreasonable to expect that sweetened condensed milk, though put on the market in hermetically sealed cans, be sterile. Nor is that essential. Where the factory is kept in sanitary condition, nothing but the best refined cane sugar is added to the milk, and a reasonable degree of cleanliness is exercised in all operations, the germs which do find their way into the condensed milk belong to the class that are rendered inactive, or dormant, owing to the density of the liquid and the large per cent of cane sugar it contains. Density and sugar are the agents which preserve the sweetened condensed milk.

On the other hand, where poorly refined cane sugar is used, or where the sugar has become damp, mouldy and sour in storage, or where the milk pipes, kettles and other receptacles do not receive a thorough cleaning daily but are allowed to become coated with remnants of decaying milk, fermentations of the most disastrous kind may set in and may cause batch after batch of condensed milk to spoil. Many condensories whose superintendents have been guilty of neglect or ignorance in this respect have suffered enormous losses, and have been "forced to the wall."

(The End)

A GENUINE SEEDLESS APPLE

By J. Eliot Coit, G.

On the morning of March 31st Mr. M. W. Harper of the College of Agriculture while taking breakfast at his boarding place, cut into an apple which contained neither seed nor core. Mr. Harper turned his find over to Mr. C. F. Kinman and a number of graduate students in horticulture who thoroughly examined the specimen. The apple was found in a mixed lot and there is little hope of its being successfully traced to its origin. The apple seemed to be an average sized Baldwin with a bright blush on a yellowish ground. It was without blemish from scab or worm. The calyx was normal and rather wide open even for a Baldwin. The quality was good to very good. This apple was perfectly solid with not a sign of core, carpels or seed. It permitted a knife to pass through its center as though it were made of cheese. In cross section the substance was quite uniform in all particulars from one side to the other, save for a ring of minute dots which marked the fibro-vascular bundles of the core lines. These were not perceptible to the teeth when bitten into.

If the twig which bore this apple could be found and propagated and should prove healthy and fruitful, we would no doubt have a variety of tremendous commercial value.

This instance serves to emphasize the fact that very often fruit growers are oblivious to the great opportunities which surround them, and per-

haps great fortunes in money are slipping through their fingers every year. Every fruit grower should cultivate watchfulness for he never knows when his fruit trees may give him a sport worth thousands of dollars to him, and millions to mankind.

Some persons have claimed that on account of the structure of the apple it could never be entirely coreless, and that a seedless apple with a core would be but little advance over the old kind. This specimen, however, proved to all those who examined it that an absolutely seedless and coreless apple with a good flavor, fair size, and of very good color had kept in perfect condition till the 31st of March, had actually been produced, and it is natural to suppose that what has been produced once may be produced again. All praise to the man with eyes sharp enough to see such a valuable sport as this before it leaves his orchard. Let us devoutly hope that the precious twig which bore this remarkable fruit will not be so unfortunate as to be pruned away and burned on the brush heap this winter, and that another opportunity will be given blind and negligent mankind to take the fruits which Providence provides.

ENTOMOLOGY AS SOMETIMES WRIT AT CORNELL

Compiled by Prof. Slingerland from examination papers.

CONCLUDED

"Insects grow in stages principally although most of them when the medium size is reached."

"Insects grow usually in the spring and summer. They grow by stages."

"Insects grow by changing from one form to another; usually, the change is going on in the winter."

"A larva is the egg of a butterfly."

"A caterpillar is the insect after the change from the larva."

"A maggot is the eggs of the fly."

"A caterpillar is a larva that feed on the outside of its host. The maggot feeds inside.

"Caterpillar—the adult worm."

"A caterpillar is the adult stage of the moth."

"A caterpillar is the pupa state of a butterfly."

"Larva is the second stage, sight of which usually produces a shudder in the fair sex."

"A chrysalis is the larva state of a butterfly."

"A chrysalid is the name given to the pupa stage of a grasshopper."

"A pupa is the shell covering the insect from which comes the cocoon."

"A cocoon is the shell or little house that an insect makes in which it lays its eggs."

"A nymph is the last stage of an insect's life, which only lasts about two weeks, only long enough for it to lay its eggs."

"A nymph is the adult form before full grown."

"A nymph is the adult insect."

"A nymph is the stage where complete metamorphosis has taken place and insect is ready to lay eggs."

"Sucking insects have a pair of antennae which punch their way through the bark or whatever the insect is living on and then the tubes are forced down in the place of the antennae."

"Sucking insects introduce their upper lip into the leaf or stem of the plant and with a hair-like arrangement provided for the purpose suck up its juices." (A sort of *hair-lipped* arrangement.)

"Insects eat in two general ways, biting and sucking. Some biting insects chew their food, others do not. Some sucking insects suck up the sap of flowers with an instrument like a needle, others do not use such a thing to suck up their food."

"The Codling-moth lays its eggs on the little apples just before the blossoms open."

"Kerosene emulsion is sometimes used on insects that breath through the pores of the body."

"Some General Farm Practices that may be employed against insects are: Strength, common sense, punctuality, to start at the proper time. Stick-to-it-iveness."

The Cornell Countryman

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S. F. WILLARD, JR., - - Assistant Managers
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JUNE, 1907

Next Year

THE Countryman Board for 1907–8 will be:—Editor, H. H. Schutz, '07; Alumni Editor, E. L. D. Seymour, '09; Associate Editors, A. W. McKay, '08, M. C. Burritt, '08, E. L. Baker, '09, and W. H. Alderman, '08; Business Manager, E. G. McCloskey, '09; Assistant Business Managers, S. F. Willard, '09, R. H. Dayton, Sp., G. H. Miller, '09.

To this board we extend all good wishes for a very successful year. The success of the *Countryman* has come to mean much both to the alumni and students of the College of Agriculture. Steadily through successive years there has been built up a reputation such that the *Countryman* stands for all that is best and highest in agriculture. To maintain this reputation and to advance it in pace with the College of Agriculture is the trust which the new board assumes.

With this issue the present board finishes its task and prepares to give place to this later generation. We confidently hope that they will take greater strides ahead than we have been able to do, making our attempts seem feeble and our issues look like last year's straw hat. If we give up the paper gladly it was because it was hard work, and if we look back sadly it is because the hard work was good fun.

Afterward

BECAUSE Cornell graduates have done the best work the Cornell College of Agriculture is known as the best in the country. In agricultural lines Cornell men are in demand. It is even said that complaints are heard because discrimination is made in their favor.

The fame of the college and its graduates does not rest upon the faculty, courses, or equipment of the school but upon the ability of its graduates to produce results. The test of an institution is the worth of its alumni. The colleges with the right alumni need send out no illustrated syllabi. Each man is an advertisement for or against his college. Every man who leaves the College of Agriculture is watched by the people among whom he lives. The name of the college is not advanced by ranting about the beauties of its scenery, the completeness of its buildings, or the wisdom of its faculty. The name of the college is advanced by every alumnus who makes good.

Of all that have gone from Cornell, the men this year are the best prepared. With an enlarged faculty, equipment and schedule of courses the college gives a better preparation than ever before. It is, therefore, expected that the graduates leaving this year shall prove the best advertisement the college has ever had. This can only be done by producing the best and the most work.

In the Good Old Summer Time

A SUMMER on a good farm is one of the best courses that a student can elect.

The professors evidently find difficulty in keeping their courses touching the ground. Even with our modern improvements the luckless student is still dragged through the mazes of extraneous discourses and antiquated text-books. Much time is wasted in airy flights of the warmer variety.

The course on the farm is strictly to the point, clarifying the knowledge gained during the winter and showing new needs for more knowledge. The course is tight to the ground—too tight sometimes for the muscles of the student.

Unless you have serious conflicts elect the following course which is not in the schedule but which ought to be :—

"1. **Practical Farming.** Lots of work and little talk. Summer term only. Credit none. Pay small. Lectures whenever you make a mistake. Laboratory M., T., W., Th., F., S., 4 A. M. 7 P. M. Instructors, the Soil, the Plants, the Animals, and a Farmer."

December, 1903

The Countryman will pay fifty cents each for the first ten copies of *The Cornell Countrym*, issue of December, 1903, that are received at the office in good condition. Please look these up.

GENERAL AGRICULTURAL NEWS

Professor B. E. Fernow, who was recently appointed to Professor of Forestry at State College, Pennsylvania, has been offered the position of the Dean of the Faculty of Forestry at the University of Toronto. Prof. Fernow will, in this position, have charge of the organization of one of the most complete systems of Forestry education on this continent. The University expects to set apart a large forest reservation which will be at the entire disposal of the school. University extension work of the broadest kind is contemplated.

* * *

The University of Wisconsin is conducting an active campaign against the spread of tuberculosis in the state. A bill has been introduced into the legislature which provides for the testing of all cattle before they are sold. The dairymen are already protected against the danger of infection from affected cattle being brought into the state and an effort will be made to prevent the spread of the disease from herd to herd within the state. Dean Russell, who besides being at the head of the Department of Bacteriology in the University, is also a member of the Live Stock Sanitary Board of Wisconsin and has given instruction in the use of tuberculin to the members of the University Agricultural Experiment Association. This numbers over one thousand members and is comprised of young farmers all over the state who have been former students of the University.

* * *

At the last meeting of the Association of American Agricultural Colleges and Experiment Stations, a commission was provided for, which should inquire into the organization and policy which should prevail in the matter of expenditure of public funds in agricultural research. President L. H. Bailey has appointed to this commission David Starr Jordan of Leland Stanford University, Carroll

D. Wright of Clarks College, Dr. H. P. Armsby of the Pennsylvania Station, Dr. W. H. Jordan of the Geneva Station and Gifford Pinchot of the Forest Service.

* * *

Dr. D. E. Salmon, who was formerly the Chief of the Bureau of Animal Industry in the Department of Agriculture at Washington has been appointed to the charge of the Veterinary Department of a university in Montevideo, Uraguay. He recently sailed and will begin his work at once.

* * *

Argentine Republic is to test the efficacy of Von Behring's treatment of tuberculosis. He will establish a hospital in Buenos Ayres where he will treat cattle which have reacted to the tuberculin test on being imported. All animals which fail to respond to the treatment after six months will be killed. Those which are reported cured will be kept under strict surveillance for three years when they will be slaughtered and a thorough post mortem examination made. Tuberculosis is extremely destructive in Argentine and the cattle owners suffer heavily through the ravages of the disease.

CAMPUS NOTES

Financial Report of the Cornell University Poultry Association for 1906–7 :

Balance from 1905–6	$ 15.76	
Total receipts from show-fees, books sold, etc.,	545.62	
Bills to collect	4.95	
Value of books on hand	59.50	
Credits		$625.83
Bills paid	$559.46	
Bills unpaid	47.21	
Debits		$606.67
Balance on hand		$ 19.16

Respectfully submitted,
C. F. BOEHLER,
April 22, 1907. Supt. of Show.

The last Assembly of the year was held in the new buildings on the evening of May 2. The program consisted of selections by the Agricultural Glee Club, and a reading from Emerson by Dean Bailey, together with a recitation of two of his own poems, was given in the auditorium, and the latter part of the evening was spent in the corridors and rooms of the main building. Though the attendance was rather small the evening was made an enjoyable one, largely through the efforts of the hostesses—Mesdames Lyon, Gilmore, Stocking, and Riley, who were assisted by Messrs. Miller, Phelps and Burritt.

* * *

The agricultural baseball team played its first game at the Alumni field against the Veterinary team, on April 20, winning by a score of 10 to 0. The line up of the team was as follows: pitcher, E. H. Anderson; catcher, C. J. Grant; 1st base, E. G. McCloskey; 2nd base, C. F. Boehler; 3d base, G. H. Miller; short-stop, O. E. Brown; outfield, G. W. Myer, C. H. Chase, H. J. Rutherford and J. S. Clark

On May 3, the team won from the Civil Engineers by a score of 7 to 5 playing practically the same team as before. The men are practicing every afternoon and prospects are bright for a successful season.

* * *

A successful meeting of the Agricultural Association was held on the evening of April 23. H. C. Pierce presented a report of a committee to attend to the amendments to the Constitution of the Association. These had to do with the new organization for student control, and were to be further discussed at the next meeting. After outlining plans for the Dedication celebration, a report was heard from F. S. Hayden upon the Extension Work. The program of the evening consisted of talks by H. E. Ross, '06 and C. S. Wilson, '05, upon Chances for Young Men in Dairy Lines, and Horticulture respectively.

Prizes won by students in Department of Poultry Husbandry, New York State College of Agriculture, Winter 1906–'07.

PRIZE FOR HIGHEST GENERAL STANDING. C. U. Poultry Department prize of $5 for the highest standing among Winter Course students, given by a member of the instructing staff, won by Henry E. Sibenman, Winter Poultry Course, '07, Peekskill, N. Y., average, 92⅔%.

PRIZE FOR BEST POULTRY HOUSE PLANS. C. U. Poultry Association, care of Mr. H. C. Pierce, President, prize of $5 for best specifications and poultry house best adapted to local conditions of contestant, Miss A. Hooker, Winter Poultry Course '07, Geneseo, N. Y.

PRIZES FOR BEST STUDENT JUDGING. *Score Card.* E G. Wyckoff, Ithaca, N. Y. and James G. Halpin, Agricultural College, Mich., prizes, value $20, R. E. Krathwohl, Buffalo, N. Y. E. G. Wyckoff and Geo. L. Ammerman, Cazenovia, N. Y., prizes, value $15, R. N. Tyler, Winter Poultry Course '07, Binghamton, N. Y. Cyphers Incubator Co., Buffalo, N. Y., prize, value $4, for regular students, E. D. Hewes, Bergen, N. Y. Same prize, $4, for Winter Course students, T. A. Goessling, Winter Poultry Course '07, West New Brighton, N. Y.

Comparison Judging. T. F. McGrew, Washington, D. C., care of the "Feather," prize for best comparison judging: First, value $3, G. W. Conover, Special '07, Englishtown, N. Y. Second, value $2, Henry Wilson, Winter Poultry Course '07, Castile, N. Y.

CANDIDATES FOR THE DEGREE OF PH.D., 1907

J. E. COIT

Mr. Coit was born in 1880 at San Antonio, Texas. He attended the public school at Salisbury, N. C., and the military school at Lenoir, N. C. Four years manager of market garden, Dallas, Tex. Was graduated B.Agr. from N. C. A. & M. College in 1903. Instructor in Hort. Home Correspondence Schools. Elected Editor Cornell Countryman for '05-'06. Elected Fellow in Agriculture for '05-'06. Mr. Coit is a member of Gamma Alpha, Sigma Xi, Lazy Club, and Agricultural Association.

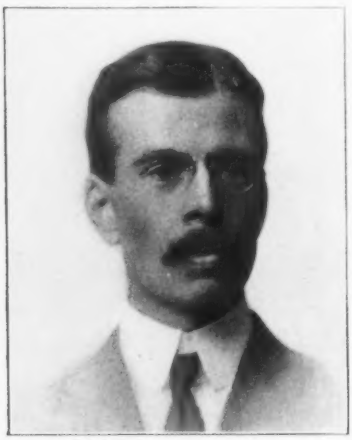
P. B. FLETCHER

Miss Fletcher was born in Harrison Valley, Penn., and prepared at the Bainbridge High School in 1893, graduated from Oneonta State Normal, 1896–7, and taught for four years in the public schools. Miss Fletcher received the degree of B. S. A. from Cornell in 1904. During the past three years she has been librarian of the Flower Veterinary Library and editor of Agricultural Department of Ithaca Daily News, Sigma Xi and member of the *Countryman* Board for 1906–7.

CANDIDATES FOR THE DEGREE OF M.S. IN AGR., 1907

Mr. Chakravarty was born in 1882, in the district of Dacca, Bengal, India. He entered the Calcutta University in 1898 and held a Government Scholarship for two years. He received his A.B degree in 1902 and entered the College of Agriculture, Bengal, from which he graduated in 1904. He entered Cornell University in 1905 and has been specializing in Agronomy and Dairying. On his return he expects to work in the agricultural department of the Government of Bengal. Member of the Cosmopolitan Club.

J. N. CHAKRAVARTY



C. F. CLARK

Mr. Clark was born at Glover, Vermont. He received his early education in the district schools and Derby academy. He graduated from the University of Vermont in 1897 and after graduation taught in the public schools of that State for two years. He was a book-keeper in a creamery for two and one-half years. He spent the remainder of the time on a farm before coming to Cornell. Mr. Clark is Assistant Agronomist of Cornell University Experiment Station and is a member of Sigma Nu and Sigma Xi.

Mr. Dutt was born at Calcutta, India, in 1881. After graduating from the New Indian School in 1897, he entered the Calcutta University and obtained the A.B. degree in 1902. The same year he entered the Agricultural College, Bengal, from which he graduated in 1904. He entered Cornel University in 1905 where he is especially interested in Agronomy and Entomology. On his return to India expects to join the agricultural staff he of the Government of Bengal. He is a member of the Cosmopolitan Club.

H. S. DUTT

A. E. GHOSH

Mr. Ghosh was born in the District of Dacca, Bengal, India. He matriculated at the Dacca Collegiate School and obtained the degree of Bachelor of Arts at the Calcutta University in 1901; studied law for one year and then entered the Provincial College of Agriculture, Bengal, where he secured a diploma in 1905. Mr. Ghosh is sent by the Government of Bengal for two years' training in Agriculture. He has specialized in Horticulture and Agronomy in which he has been carrying on research work. On his return to India next winter he will teach in the Bengal College of Agriculture.

Mr. Kinman was born in Illinois in 1880. Since 1885 his home has been in Kansas. In 1904 he graduated from the Kansas Agricultural College and went to Alabama as assistant horticulturist in the Alabama Polytechnic Institute. In 1906 he secured a leave of absence from his duties in Alabama, and since that time has been pursuing graduate work in the Horticultural Department at Cornell University.

C. F. KINMAN

R. MATHESON

Mr. Matheson was born in Picton County, Nova Scotia, Canada and graduated from the Picton County Academy and later from the School of Agriculture, Truro, N. S. Mr. Matheson specialized in Entomology and received his B. S. A. at Cornell in 1906. Member of Sigma Xi.

Mr. Morgan was born at Hampshire, Illinois in 1877 and lived on a farm till eighteen years old. He graduated from the High School in 1895 and then attended the Illinois State Normal University from which he graduated in 1899. He attended the University of Illinois from which he graduated in 1905 in the General Science Course. Six months he taught at the Burlington High School, Iowa, and for the year 1906 as principal of the Normal Training School at De Kalb, Illinois.

O. S. MORGAN

S. N. SIL

Mr. Sil was born in Calcutta, India, in 1882 and obtained school and college training at Duff College, Calcutta with first class matriculation in 1898. He entered college the same year and was Duff, London and Edinburgh Scholar throughout his college years. In 1902 he received the Bachelor's Degree in Arts from Calcutta University. In 1904 he graduated from the Higher Agricultural Department of Engineering College, Silpur. He expects to enter the Government Agricultural Staff of Bengal, India. Member Sigma Xi and Cosmopolitan Club.

CANDIDATES FOR THE DEGREE OF B. S. IN AGR., 1907

F. ALEMAN

Mr. Aleman was born in 1881 in Buenos Ayres, Argentina, "the metropolis of South America." He prepared for Cornell in the National College of Argentina. Since coming to Cornell he has been prominent in various activities and leaves a strong Cornellian. He is about to spend a year or more in Europe, India, China and Japan and will return to Argentina to supervise his father's estates. Member of Delta Upsilon Fraternity and the "Tertulia" Club.

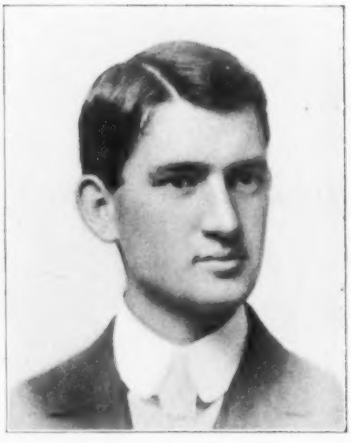
Mr. Ayer came from Angola, Erie Co., N. Y. He entered Cornell as a special student with the class of '06. Recognizing the superior advantages of a regular course, he left the college at the end of his second year to complete his preparatory work by a year at the Ithaca High School. Mr. Ayer has taken most of the courses offered in Dairy Industry and Animal Husbandry. After graduation he goes to fill a position at the Hampton Normal and Industrial Institute at Hampton, Va., where he will have charge of the dairy herd of 40 cows and will teach Animal Husbandry.

L. F. AYER

G. G. BURLINGAME

Mr. Burlingame is from Syracuse, N. Y., and while at Cornell has specialized in Dairying and Horticulture. He is a member of the Chi Phi Fraternity and has played on the Cornell Tennis Team for four years.

Mr. Cleeves was born in 1882 on a farm at Meadowbrook, Orange, Co., N. Y. After graduating from the Cornwall High School he entered Union College with the intention of following the electrical engineering course, but his love of the country could not stand the prospect of living between walls of brick. He came to Cornell and entered the Agricultural College as sophomore. He has selected his courses with the idea of operating a mixed system of farming.



E. W. CLEEVES

G. D. COOPER

Mr. Cooper was born in Auburn, N. Y., where he resided until fourteen years old, since then his home has been in the country east of Auburn. He graduated from Auburn High School with the class of 1903 and entered Cornell with the class of 1907. After a year spent in the College of Arts he entered the College of Agriculture where he has specialized in Landscape Architecture. He was elected President of the Agricultural Association in his senior year. After graduation he will enter the employ of a Landscape Architect for the first few years.

Mr. Dragoshinoff was born in Sevlievo, Bulgaria, in 1883. He studied three years in the Gymnasium in Sevlievo. Then entered Robert College (an American College in Constantinople, Turkey), where he received the degree of A.B. in June, 1904. In the fall of 1904 he entered the Agricultural College in Cornell University. He is going to Germany to continue his studies for one year before he goes back to Bulgaria on the farm.

D. G. DRAGOSHINOFF

V. R. FRENCH

Miss French was born in Cincinnati, O. She prepared for college in Miss Butler's School at Walnut Hills, the high school at Ann Arbor, Mich., and the high school at Amherst, Mass., where she graduated in 1903. After two years at the Massachusetts Agricultural College, she came to Cornell where she has continued her study of agriculture. After graduating, she expects to get a Master's degree at Iowa Agricultural College. She organized the Cat Show, the Esperanto Club and the Girl's Track Team.

Mr. Goldhaar was born in New York City in 1884 and attended the public schools and the DeWitt Clinton High School. In 1903 he entered the College of the City of New York pursuing a scientific mechanical course. In 1905 he entered the Junior year of the College of Agriculture and has specialized in soils. He expects to enter the Soil Survey of the United States and later to carry on research work in Soil Physics.

J. GOLDHAAR

H. B. GRUBB

Mr. Grubb was born at York, England, in June, 1883. He obtained his education at that place, leaving school in 1900. For four years he studied the fruit and nursery business in England. In September, 1904, he entered Cornell as a special student in agriculture, entering the regular course in February, 1906. He has specialized in horticulture and landscape architecture.

Mr. Grubb was born at York, England in 1881 and finished his preparatory studies at Bootham School, York. In 1904 he entered Cornell as a special student in horticulture but took up Rural Art and became a regular student. Mr. Grubb expects to return next year for post-graduate work.

N. H. GRUBB

M. GUNNISON

Miss Gunnison was born at Erie, Penn., and attended the Erie Academy, Lasell Seminary and Chicago University. She was reference librarian in the Erie Public Library for five years and is now pursuing agriculture on her farm at Harbor Creek, Erie Co., Penn., where she hopes to make a specialty of fruit and poultry.

Mr. Hammar was born in Brönnestad, Sweden in 1880. He attended Kristianstad's and Lund's Gymnasia. After eight years of experience in tropical Brazil he found his way to the Cornell Agricultural College in 1903. He is especially interested in Entomology and the science of Natural History. During the fall and winter of 1906 he took part in Louisiana Geological Survey. He is a member of the Agassiz Club, Cosmopolitan Club. Gamma Alpha and Sigma Xi. When through college he in tendsto take up entomology as his life work.

A. G. HAMMAR

M. JENKINS

Miss Jenkins was born on a farm near Walton, N. Y. She was graduated from Walton High School in 1903 and the same fall entered Cornell as a regular student in the college of agriculture. She was brought up on a dairy and fruit farm and while in college has made dairy industry her specialty, expecting to follow this line of work in the future.

Miss Kleniewska was born in Neizdow, Poland. She went to school at Breslau, Germany and came to America in 1903; prepared for college at Ivy House School, Germantown, Phila., and entered the Iowa State College with the class of 1908 as a student in agronomy. After spending one year there she came to Cornell University. After she gets a master's degree in agriculture she will return home and manage her father's estate in Poland.

B. KLENIEWSKA

E. W. LELAND

Mr. Leland came from Springville, N. Y. He prepared for college at Griffith Institute in his home town. Entering the Cornell College of Agriculture in the fall of 1903, he took special work in Horticulture and Agricultural Chemistry. Mr. Leland expects to remain at Cornell another year for more work in Agricultural Chemistry.

Mr. Morse comes from Lowville, N. Y. He prepared for college in his native town at Lowville Academy. Having taken the Latin Scientific and Normal courses in his "prep" school, he was well fitted to specialize in Agronomy and Agrostology at the Cornell College of Agriculture. Upon leaving Cornell, he expects to follow up experimental work with the grass and forage crops.

W. J. MORSE

S. H. PERKY

Mr. Perky was born in Denver, Col., in August, 1880. After receiving his B.S.A. he intends to remain to take a Ph.D., the subject of his advanced work being Rural Sociology. He was one of the founders of *The Cornell Countryman* and was Associate Editor during its first year. He was also the first chairman of the committee which organized the Experimenters' League, and for three years helped conduct the Agricultural Students Extension Work. He is a member of Alpha Zeta.

Mr. Pierce was born at Worcester, Mass., and graduated from the Worcester English High School in 1901. He entered Sibley College in 1902 but changed to take Agriculture in 1905. After graduation he goes to Iowa State College as Instructor in charge of Poultry. He is a member of Cerebus, Cosmopolitan Club, Masonic Club, *Countryman* Board (3) and President of the Cornell University Poultry Association (4).

H. C. PIERCE

H. F. PRINCE

Mr. Prince graduated from the High School at Bloomington, Ill., in 1900. After working in horticultural lines for three years in Illinois and Michigan, he entered Cornell as a special student but changed to the regular course in the next year. He has specialized in poultry and landscape architecture. Expects to commence farming July first in Colorado. He has served as director of the Poultry Association for three years and is Alumni Editor of *The Cornell Countryman*.

Mr. Roberts was born in Brooklyn, N. Y., in 1885. After graduating from the Hempstead High school, he entered the College of Agriculture with the class of 1906. Because of the typhoid fever, however, he did not return until the following year thus entering the class of 1907. Since his return, Mr. Roberts has devoted his time to a rather general course, specializing if any in horticulture. Mr. Roberts made his class numerals in baseball and captained the first Agricultural Intercollege Baseball Team.

J. S. ROBERTS

H. H. SCHUTZ

Mr. Schutz was born at El Paso, Texas, in 1882 and was graduated from the High School there. He studied at the New Mexico College of Agriculture and Mechanic Arts, taking the academic course and specializing in chemistry in which he acted as assistant for two years. Mr. Schutz came to Cornell in 1905, registering in Agriculture. Member of Alpha Zeta, Cosmopolitan Club, Texas Club.

Mr. Shepard was born in Buffalo, N. Y., in 1884 and was prepared at Masten Park High School in that city. He entered the regular four-year course in 1903 and has given most of his time to general agricultural subjects, especially the branches of soils and farm management. Mr. Shepard expects to spend a few years getting practical experience and then return to Cornell for more specialized studies.

J. B. SHEPARD

Y. H. TONG

Mr. Tong was born in Canton, China, in 1884. He graduated Provincial School (Chinese) and received his English education at the Queen's College, Hong Kong. In 1904 he was sent by his government to the United States to study Agriculture and has since made a specialty of Agronomy. After graduation Mr. Tong expects to stay at Cornell for another year to pursue post-graduate courses.

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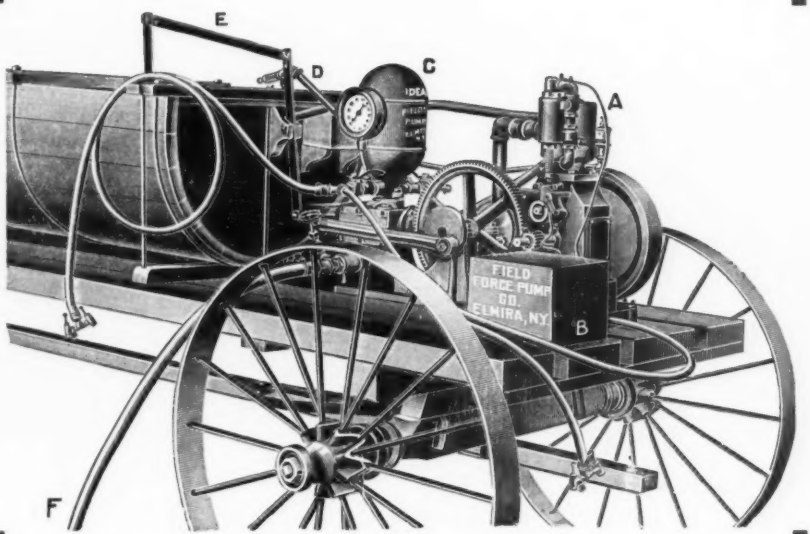

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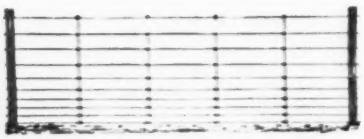

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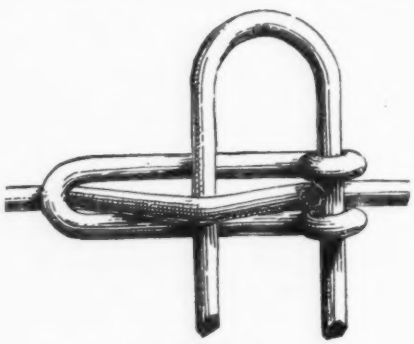

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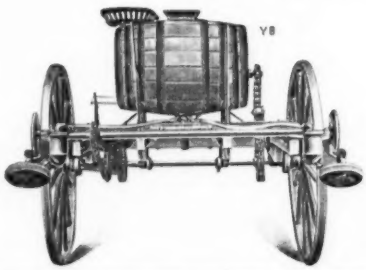

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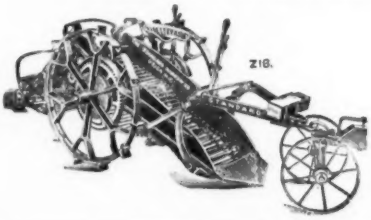

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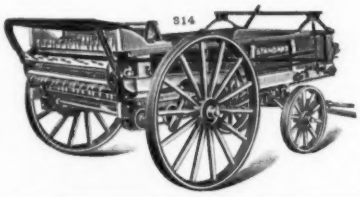

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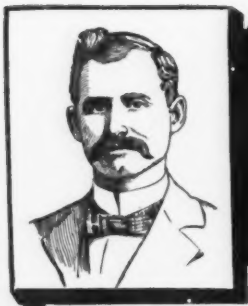

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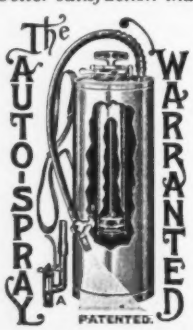

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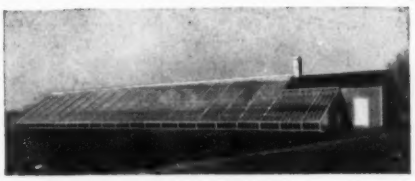

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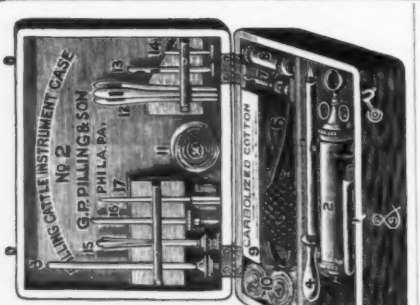

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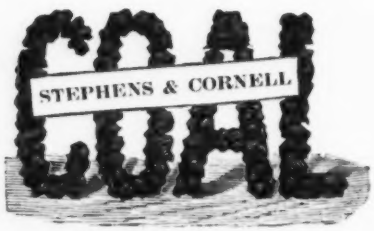

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This preparation is Lime, Sulphur and Salt making a concentrated Poly-sulphide of Calcium. The Salt adds to the adhesive properties, but the destructiveness to Scale Life lies in the Calcium Sulphide. ☞Aside from its ability to destroy San Jose Scale, Horicum is a Fungicide, preventing the free development of fungoid troubles.

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As I stated in my former correspondance, you cannot improve on your preparation regarding the combining of the sulphur employed, more than you have in this *Horicum*.

By grading the dilution you can make it of any desired strength. I would strongly advise you to adhere to your present proportion of materials as well as your modus operandi.

If Lime, Sulphur and Salt is at all efficacious for the destruction of San Jose Scale, *Horicum* should be the most desirable for that purpose.

Yours respectfully, JOHN MEYER, Chemist.

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The French Bordeaux Mixture.

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The small pails add considerably to its cost, therefore the cost lessens appreciably in larger packages. Put up in quarts and gallons to 50 gallon barrels.

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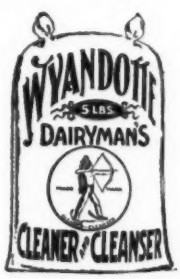

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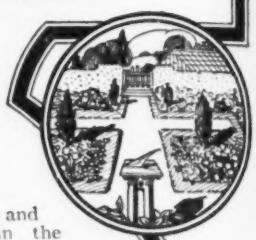

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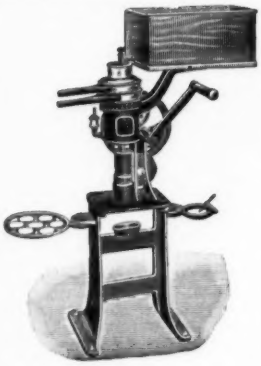

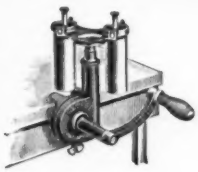

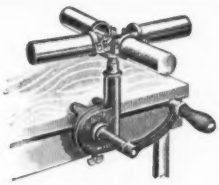

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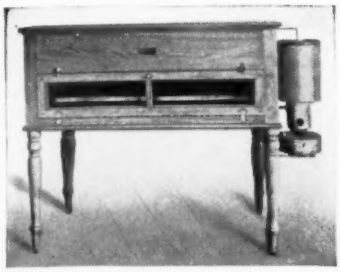

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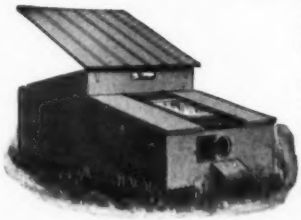

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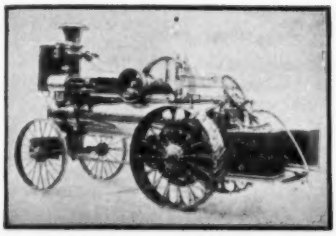

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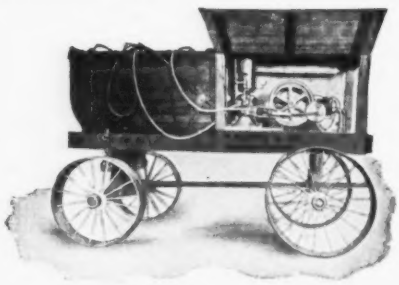

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